1

SEQUENCE LISTING

<110> Institut Pasteur

<120>   PLASMODIUM FALCIPARUM ANTIGENS AND THEIR VACCINE AND
        DIAGNOSTIC APPLICATIONS

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<150>   CA 2,345,206
<151>   2001-05-16

<150>   CA 2,346,968
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<170>   PatentIn version 3.1

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agagaagatc ctattgcttc tgaaactgaa gttgtaagtg aacctgagga ttcaagtagg   180

ataatgacta cagaagttcc aagtactact gtaaaacccc ctgatgaaaa acgatctgaa   240

gaagtaggag aaaaagaagc taaagaaatt aaagtagaac ctgttgtacc aagagccatt   300

ggagaaccaa tggaaaattc tgtgagcgta cagtcccctc ctaaggaatt c   351

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Glu Phe His Met His Asp Tyr Ile Tyr Asp Asp Arg Ile Tyr Asn Asn
1   5   10   15

Asp Lys Glu Lys Asn Val Ile Lys Ser Asp Asn Lys Asn Val Ile Lys
            20   25   30

Ser Asp Asn Lys Asn Asp Tyr Lys Lys Cys Asn Lys Asn Val Ile Lys
            35   40   45

Ser Asp Asn Lys Asn Val Ile Lys Ser Asp Asn Lys Asn Val Glu Phe
        50   55   60

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<213>   Plasmodium falciparum

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Glu Phe Pro Asp Pro Arg Ser Asn Asp Gln Glu Asp Ala Thr Asp Asp
1   5   10   15

Val Val Glu Asn Ser Arg Asp Asp Asn Asn Ser Leu Ser Asn Ser Val
            20   25   30

Asp Asn Gln Ser Asn Val Leu Asn Arg Glu Asp Pro Ile Ala Ser Glu
            35   40   45

Thr Glu Val Val Ser Glu Pro Glu Asp Ser Ser Arg Ile Met Thr Thr
    50   55   60

Glu Val Pro Ser Thr Thr Val Lys Pro Pro Asp Glu Lys Arg Ser Glu
65   70   75   80

Glu Val Gly Glu Lys Glu Ala Lys Glu Ile Lys Val Glu Pro Val Val
                85   90   95

Pro Arg Ala Ile Gly Glu Pro Met Glu Asn Ser Val Ser Val Gln Ser
            100   105   110

Pro Pro Lys Glu Phe
            115

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<213>  Plasmodium falciparum

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Asp Asn Lys Asn Asp
1                5


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Asp Lys Glu Lys Asn Val
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Lys Ser Asp Asn Lys Asn Val
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1               5                   10                  15

gat tgg ata aac cag att ttt aaa aag aat tct tta caa tgt gat tta        96
Asp Trp Ile Asn Gln Ile Phe Lys Lys Asn Ser Leu Gln Cys Asp Leu
            20                  25                  30

tat ttt ttg gat gac aac aaa gaa aaa gat gtt agt aag aaa aga aaa       144
Tyr Phe Leu Asp Asp Asn Lys Glu Lys Asp Val Ser Lys Lys Arg Lys
            35                  40                  45

gct caa ttg aag gat gaa tat gat aat ata tca agg agc aaa gaa aat       192
Ala Gln Leu Lys Asp Glu Tyr Asp Asn Ile Ser Arg Ser Lys Glu Asn
        50                  55                  60

att aat aat tcc aaa aaa ata aaa aat gaa tta agt ata aaa gat aat       240
Ile Asn Asn Ser Lys Lys Ile Lys Asn Glu Leu Ser Ile Lys Asp Asn
65                  70                  75                  80

atg cac gat tac ata tat gat gat cgt atc tac aat aat gat aaa gag       288
Met His Asp Tyr Ile Tyr Asp Asp Arg Ile Tyr Asn Asn Asp Lys Glu
                85                  90                  95

aaa aat gtt ata aaa agt gat aat aaa aat gtt ata aaa agt gat aat       336
Lys Asn Val Ile Lys Ser Asp Asn Lys Asn Val Ile Lys Ser Asp Asn
            100                 105                 110

aaa aat gat tat aaa aag tgt aat aaa aat gtt ata aaa agt gat aat       384
Lys Asn Asp Tyr Lys Lys Cys Asn Lys Asn Val Ile Lys Ser Asp Asn
            115                 120                 125

aaa aat gtt ata aaa agt gat aat aaa aat gtt ata aaa agt gat aat       432
Lys Asn Val Ile Lys Ser Asp Asn Lys Asn Val Ile Lys Ser Asp Asn
        130                 135                 140

aaa aat gtt ata aaa agt gat tat aaa agt gat gat aga aat gct tgt       480
Lys Asn Val Ile Lys Ser Asp Tyr Lys Ser Asp Asp Arg Asn Ala Cys
145                 150                 155                 160

gat att tat aaa agt aat aaa aaa aat gtt cct gat aat tgc cat ata       528
Asp Ile Tyr Lys Ser Asn Lys Lys Asn Val Pro Asp Asn Cys His Ile
                165                 170                 175

tat gat gat aat agt tca gtt gaa aat tta gat gga aaa aat aaa tta       576
Tyr Asp Asp Asn Ser Ser Val Glu Asn Leu Asp Gly Lys Asn Lys Leu
            180                 185                 190

aat aat ata agg aac ata cat aat gat aac tca tct tca tgc gat ata       624
Asn Asn Ile Arg Asn Ile His Asn Asp Asn Ser Ser Ser Cys Asp Ile
            195                 200                 205

tcc gat ata aaa agt gaa gat gaa tat ata gaa cca tat gaa aaa aag       672
Ser Asp Ile Lys Ser Glu Asp Glu Tyr Ile Glu Pro Tyr Glu Lys Lys
        210                 215                 220
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aat gaa gaa aat ata aat gaa tat aag aat aag aaa aat ata gcc aat       720
Asn Glu Glu Asn Ile Asn Glu Tyr Lys Asn Lys Lys Asn Ile Ala Asn
225                 230             235                 240

gaa aat ata aaa gaa gga aag agt tca att tat aat gat gaa cat aat       768
Glu Asn Ile Lys Glu Gly Lys Ser Ser Ile Tyr Asn Asp Glu His Asn
                    245             250                 255

tat aat tca tta tta tat aat tct tgt aat ggt gaa ata agt aag atc       816
Tyr Asn Ser Leu Leu Tyr Asn Ser Cys Asn Gly Glu Ile Ser Lys Ile
                260             265                 270

aac aaa ata agt agt cat aat aat att gat aat aat atg gat aat tat       864
Asn Lys Ile Ser Ser His Asn Asn Ile Asp Asn Asn Met Asp Asn Tyr
            275             280             285

aat acg ttt gca aat gtg aat aat ttt ata ata tat tcc tca gat gat       912
Asn Thr Phe Ala Asn Val Asn Asn Phe Ile Ile Tyr Ser Ser Asp Asp
        290             295             300

gaa gat aat ata tca aat tat tat aat ggt aaa gac gta tta aat gat       960
Glu Asp Asn Ile Ser Asn Tyr Tyr Asn Gly Lys Asp Val Leu Asn Asp
305             310             315                 320

gag att atg ttc cct ata aaa ttt aat ttt gaa aaa tta aaa aaa aat      1008
Glu Ile Met Phe Pro Ile Lys Phe Asn Phe Glu Lys Leu Lys Lys Asn
                325             330                 335

att tat gta ata gag cat ata gac aaa ata tat tat gat aca ttt tta      1056
Ile Tyr Val Ile Glu His Ile Asp Lys Ile Tyr Tyr Asp Thr Phe Leu
            340             345             350

aat aaa aat cca agt gaa aaa agt gtt ttt atg aat gat gaa tct act      1104
Asn Lys Asn Pro Ser Glu Lys Ser Val Phe Met Asn Asp Glu Ser Thr
            355             360             365

ggt tat ttg aaa aat gat gtg aat gac aaa tgt gtt gtt gat aat ata      1152
Gly Tyr Leu Lys Asn Asp Val Asn Asp Lys Cys Val Val Asp Asn Ile
370             375             380

aat gtt att aat cct tct agt gtg aat acg ttg agt aat att tca aat      1200
Asn Val Ile Asn Pro Ser Ser Val Asn Thr Leu Ser Asn Ile Ser Asn
385             390             395                 400

att agg aat gaa aaa ata gaa aat aat aat aag aat gaa aaa tta ata      1248
Ile Arg Asn Glu Lys Ile Glu Asn Asn Asn Lys Asn Glu Lys Leu Ile
                405             410                 415

aaa tca tat cct aca caa tca aaa aat gtt atg agt aca ttt tcc ttt      1296
Lys Ser Tyr Pro Thr Gln Ser Lys Asn Val Met Ser Thr Phe Ser Phe
            420             425                 430

tgg aat att gaa aag gag aca ttt ata aca aaa cct ttg tat gca caa      1344
Trp Asn Ile Glu Lys Glu Thr Phe Ile Thr Lys Pro Leu Tyr Ala Gln
            435             440             445
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aat ttg aga aaa aaa caa ttt agt tta tta gat gaa tct gaa gag atg          1392
Asn Leu Arg Lys Lys Gln Phe Ser Leu Leu Asp Glu Ser Glu Glu Met
    450             455             460


ata aga aat tat tca tct aat caa tat tct ata aaa ttt gta cca aga          1440
Ile Arg Asn Tyr Ser Ser Asn Gln Tyr Ser Ile Lys Phe Val Pro Arg
465             470             475             480


cat tta tta tat gta atg agt caa gtt gct tct cga tcc ttt ttt gat          1488
His Leu Leu Tyr Val Met Ser Gln Val Ala Ser Arg Ser Phe Phe Asp
            485             490             495


cct tta tat aga aag cag tta ttt ttt cgt tac taa                          1524
Pro Leu Tyr Arg Lys Gln Leu Phe Phe Arg Tyr
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<212> PRT
<213> Plasmodium falciparum

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Asp Trp Ile Asn Gln Ile Phe Lys Lys Asn Ser Leu Gln Cys Asp Leu
            20              25              30


Tyr Phe Leu Asp Asp Asn Lys Glu Lys Asp Val Ser Lys Lys Arg Lys
        35              40              45


Ala Gln Leu Lys Asp Glu Tyr Asp Asn Ile Ser Arg Ser Lys Glu Asn
    50              55              60


Ile Asn Asn Ser Lys Lys Ile Lys Asn Glu Leu Ser Ile Lys Asp Asn
65              70              75              80


Met His Asp Tyr Ile Tyr Asp Asp Arg Ile Tyr Asn Asn Asp Lys Glu
            85              90              95


Lys Asn Val Ile Lys Ser Asp Asn Lys Asn Val Ile Lys Ser Asp Asn
            100             105             110


Lys Asn Asp Tyr Lys Lys Cys Asn Lys Asn Val Ile Lys Ser Asp Asn
        115             120             125


Lys Asn Val Ile Lys Ser Asp Asn Lys Asn Val Ile Lys Ser Asp Asn
    130             135             140
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Lys Asn Val Ile Lys Ser Asp Tyr Lys Ser Asp Asp Arg Asn Ala Cys
145   150   155   ·   160

Asp Ile Tyr Lys Ser Asn Lys Lys Asn Val Pro Asp Asn Cys His Ile
              165   170   175

Tyr Asp Asp Asn Ser Ser Val Glu Asn Leu Asp Gly Lys Asn Lys Leu
              180   185   190

Asn Asn Ile Arg Asn Ile His Asn Asp Asn Ser Ser Ser Cys Asp Ile
          195   200   205

Ser Asp Ile Lys Ser Glu Asp Glu Tyr Ile Glu Pro Tyr Glu Lys Lys
    210   215   220

Asn Glu Glu Asn Ile Asn Glu Tyr Lys Asn Lys Lys Asn Ile Ala Asn
225   230   235   240

Glu Asn Ile Lys Glu Gly Lys Ser Ser Ile Tyr Asn Asp Glu His Asn
              245   250   255

Tyr Asn Ser Leu Leu Tyr Asn Ser Cys Asn Gly Glu Ile Ser Lys Ile
              260   265   270

Asn Lys Ile Ser Ser His Asn Asn Ile Asp Asn Asn Met Asp Asn Tyr
          275   280   285

Asn Thr Phe Ala Asn Val Asn Asn Phe Ile Ile Tyr Ser Ser Asp Asp
    290   295   300

Glu Asp Asn Ile Ser Asn Tyr Tyr Asn Gly Lys Asp Val Leu Asn Asp
305   310   315   320

Glu Ile Met Phe Pro Ile Lys Phe Asn Phe Glu Lys Leu Lys Lys Asn
              325   330   335

Ile Tyr Val Ile Glu His Ile Asp Lys Ile Tyr Tyr Asp Thr Phe Leu
          340   345   350

Asn Lys Asn Pro Ser Glu Lys Ser Val Phe Met Asn Asp Glu Ser Thr
          355   360   365

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Gly Tyr Leu Lys Asn Asp Val Asn Asp Lys Cys Val Val Asp Asn Ile
    370             375             380

Asn Val Ile Asn Pro Ser Ser Val Asn Thr Leu Ser Asn Ile Ser Asn
385             390             395             400

Ile Arg Asn Glu Lys Ile Glu Asn Asn Asn Lys Asn Glu Lys Leu Ile
            405             410             415

Lys Ser Tyr Pro Thr Gln Ser Lys Asn Val Met Ser Thr Phe Ser Phe
            420             425             430

Trp Asn Ile Glu Lys Glu Thr Phe Ile Thr Lys Pro Leu Tyr Ala Gln
            435             440             445

Asn Leu Arg Lys Lys Gln Phe Ser Leu Leu Asp Glu Ser Glu Glu Met
    450             455             460

Ile Arg Asn Tyr Ser Ser Asn Gln Tyr Ser Ile Lys Phe Val Pro Arg
465             470             475             480

His Leu Leu Tyr Val Met Ser Gln Val Ala Ser Arg Ser Phe Phe Asp
            485             490             495

Pro Leu Tyr Arg Lys Gln Leu Phe Phe Arg Tyr
            500             505
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atg aaa ggg aaa atg aat atg tgt ttg ttt ttt ttc tat tct ata tta        48
Met Lys Gly Lys Met Asn Met Cys Leu Phe Phe Phe Tyr Ser Ile Leu
1               5               10              15

tat gtt gta tta tgt acc tat gta tta ggt ata agt gaa gag tat ttg        96
Tyr Val Val Leu Cys Thr Tyr Val Leu Gly Ile Ser Glu Glu Tyr Leu
            20              25              30

aag gaa agg ccc caa ggt tta aat gtt gag act aat aat aat aat aat       144
Lys Glu Arg Pro Gln Gly Leu Asn Val Glu Thr Asn Asn Asn Asn Asn
        35              40              45

aat aat aat aat aat aat agt aat agt aac gat gcg atg tct ttt gta       192
Asn Asn Asn Asn Asn Asn Ser Asn Ser Asn Asp Ala Met Ser Phe Val
        50              55              60

aat gaa gta ata agg ttt ata gaa aac gag aag gat gat aaa gaa gat       240
Asn Glu Val Ile Arg Phe Ile Glu Asn Glu Lys Asp Asp Lys Glu Asp
65              70              75              80

aaa aaa gtg aag ata ata tct aga cct gtt gag aat aca tta cat aga       288
Lys Lys Val Lys Ile Ile Ser Arg Pro Val Glu Asn Thr Leu His Arg
                85              90              95

tat cca gtt agt tct ttt ctg aat atc aaa aag tat ggt agg aaa ggg       336
Tyr Pro Val Ser Ser Phe Leu Asn Ile Lys Lys Tyr Gly Arg Lys Gly
            100             105             110

gaa tat ttg aat aga aat agt ttt gtt caa aga tca tat ata agg ggt       384
Glu Tyr Leu Asn Arg Asn Ser Phe Val Gln Arg Ser Tyr Ile Arg Gly
            115             120             125

tgt aaa gga aaa aga agc aca cat aca tgg ata tgt gaa aat aaa ggg       432
Cys Lys Gly Lys Arg Ser Thr His Thr Trp Ile Cys Glu Asn Lys Gly
        130             135             140

aat aat aat ata tgt att cct gat aga cgt gta caa tta tgt ata aca       480
Asn Asn Asn Ile Cys Ile Pro Asp Arg Arg Val Gln Leu Cys Ile Thr
145             150             155             160

gct ctt caa gat tta aaa aat tca gga tct gaa acg act gat aga aaa       528
Ala Leu Gln Asp Leu Lys Asn Ser Gly Ser Glu Thr Thr Asp Arg Lys
                165             170             175

tta tta aga gat aaa gta ttt gat tca gct atg tat gaa act gat ttg       576
Leu Leu Arg Asp Lys Val Phe Asp Ser Ala Met Tyr Glu Thr Asp Leu
            180             185             190

tta tgg aat aaa tat ggt ttt cgt gga ttt gat gat ttt tgt gac gat       624
Leu Trp Asn Lys Tyr Gly Phe Arg Gly Phe Asp Asp Phe Cys Asp Asp
        195             200             205
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gta aaa aat agt tat tta gat tat aaa gat gtt ata ttt gga acc gat        672
Val Lys Asn Ser Tyr Leu Asp Tyr Lys Asp Val Ile Phe Gly Thr Asp
    210             215             220

tta gat aaa aat aat ata tca aag tta gta gag gaa tca tta aaa cgt        720
Leu Asp Lys Asn Asn Ile Ser Lys Leu Val Glu Glu Ser Leu Lys Arg
225             230             235             240

ttt ttt aaa aaa gat agt agt gta ctt aat cct act gct tgg tgg aga       768
Phe Phe Lys Lys Asp Ser Ser Val Leu Asn Pro Thr Ala Trp Trp Arg
            245             250             255

agg tat gga aca aga cta tgg aaa act atg ata cag cca tat gct cat       816
Arg Tyr Gly Thr Arg Leu Trp Lys Thr Met Ile Gln Pro Tyr Ala His
            260             265             270

tta gga tgt aga aaa cct gat gag aat gaa cct cag ata aat aga tgg      864
Leu Gly Cys Arg Lys Pro Asp Glu Asn Glu Pro Gln Ile Asn Arg Trp
        275             280             285

att ctg gaa tgg ggg aaa tat aat tgt aga tta atg aag gag aaa gaa     912
Ile Leu Glu Trp Gly Lys Tyr Asn Cys Arg Leu Met Lys Glu Lys Glu
    290             295             300

aaa ttg tta aca gga gaa tgt tct gtt aat aga aaa aaa tct gac tgc     960
Lys Leu Leu Thr Gly Glu Cys Ser Val Asn Arg Lys Lys Ser Asp Cys
305             310             315             320

tca acc gga tgt aat aat gag tgt tat acc tat agg agt ctt att aat    1008
Ser Thr Gly Cys Asn Asn Glu Cys Tyr Thr Tyr Arg Ser Leu Ile Asn
            325             330             335

aga caa aga tat gag gtc tct ata tta gga aaa aaa tat att aaa gta    1056
Arg Gln Arg Tyr Glu Val Ser Ile Leu Gly Lys Lys Tyr Ile Lys Val
            340             345             350

gta cga tat act ata ttt agg aga aaa ata gtt caa cct gat aat gct    1104
Val Arg Tyr Thr Ile Phe Arg Arg Lys Ile Val Gln Pro Asp Asn Ala
        355             360             365

ttg gat ttt tta aaa tta aat tgt tct gag tgt aag gat att gat ttt    1152
Leu Asp Phe Leu Lys Leu Asn Cys Ser Glu Cys Lys Asp Ile Asp Phe
    370             375             380

aaa ccc ttt ttt gaa ttt gaa tat ggt aaa tat gaa gaa aaa tgt atg    1200
Lys Pro Phe Phe Glu Phe Glu Tyr Gly Lys Tyr Glu Glu Lys Cys Met
385             390             395             400

tgt caa tca tat att gat tta aaa atc caa ttt aaa aat aat gat att    1248
Cys Gln Ser Tyr Ile Asp Leu Lys Ile Gln Phe Lys Asn Asn Asp Ile
            405             410             415

tgt tca ttt aat gct caa aca gat act gtt tct agc gat aaa aga ttt    1296
Cys Ser Phe Asn Ala Gln Thr Asp Thr Val Ser Ser Asp Lys Arg Phe
            420             425             430
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tgt ctt gaa aag aaa gaa ttt aaa cca tgg aaa tgt gat aaa aat tct        1344
Cys Leu Glu Lys Lys Glu Phe Lys Pro Trp Lys Cys Asp Lys Asn Ser
        435                 440                 445

ttt gaa aca gtt cat cat aaa ggt gta tgt gtg tca ccg aga aga caa        1392
Phe Glu Thr Val His His Lys Gly Val Cys Val Ser Pro Arg Arg Gln
        450                 455                 460

ggt ttt tgt tta gga aat ttg aac tat cta ctg aat gat gat att tat        1440
Gly Phe Cys Leu Gly Asn Leu Asn Tyr Leu Leu Asn Asp Asp Ile Tyr
465                 470                 475                 480

aat gta cat aat tca caa cta ctt atc gaa att ata atg gct tct aaa        1488
Asn Val His Asn Ser Gln Leu Leu Ile Glu Ile Ile Met Ala Ser Lys
                485                 490                 495

caa gaa gga aag tta tta tgg aaa aaa cat gga aca ata ctt gat aac        1536
Gln Glu Gly Lys Leu Leu Trp Lys Lys His Gly Thr Ile Leu Asp Asn
                500                 505                 510

cag aat gca tgc aaa tat ata aat gat agt tat gtt gat tat aaa gat        1584
Gln Asn Ala Cys Lys Tyr Ile Asn Asp Ser Tyr Val Asp Tyr Lys Asp
        515                 520                 525

ata gtt att gga aat gat tta tgg aat gat aac aac tct ata aaa gtt        1632
Ile Val Ile Gly Asn Asp Leu Trp Asn Asp Asn Asn Ser Ile Lys Val
        530                 535                 540

caa aat aat tta aat tta att ttt gaa aga aat ttt ggt tat aaa gtt        1680
Gln Asn Asn Leu Asn Leu Ile Phe Glu Arg Asn Phe Gly Tyr Lys Val
545                 550                 555                 560

gga aga aat aaa ctc ttt aaa aca att aaa gaa tta aaa aat gta tgg        1728
Gly Arg Asn Lys Leu Phe Lys Thr Ile Lys Glu Leu Lys Asn Val Trp
                565                 570                 575

tgg ata tta aat aga aat aaa gta tgg gaa tca atg aga tgt gga att        1776
Trp Ile Leu Asn Arg Asn Lys Val Trp Glu Ser Met Arg Cys Gly Ile
                580                 585                 590

gac gaa gta gat caa cgt aga aaa act tgt gaa aga ata gat gaa cta        1824
Asp Glu Val Asp Gln Arg Arg Lys Thr Cys Glu Arg Ile Asp Glu Leu
        595                 600                 605

gaa aac atg cca caa ttc ttt aga tgg ttt tca caa tgg gca cat ttc        1872
Glu Asn Met Pro Gln Phe Phe Arg Trp Phe Ser Gln Trp Ala His Phe
        610                 615                 620

ttt tgt aag gaa aaa gaa tat tgg gaa tta aaa tta aat gat aaa tgt        1920
Phe Cys Lys Glu Lys Glu Tyr Trp Glu Leu Lys Leu Asn Asp Lys Cys
625                 630                 635                 640

aca ggt aat aat gga aaa tcc tta tgt cag gat aaa aca tgt caa aat        1968
Thr Gly Asn Asn Gly Lys Ser Leu Cys Gln Asp Lys Thr Cys Gln Asn
                645                 650                 655
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gtg tgt act aat atg aat tat tgg aca tat act aga aaa tta gct tat        2016
Val Cys Thr Asn Met Asn Tyr Trp Thr Tyr Thr Arg Lys Leu Ala Tyr
            660             665                 670

gaa ata caa tcc gta aaa tat gat aaa gat aga aaa tta ttt agt ctt        2064
Glu Ile Gln Ser Val Lys Tyr Asp Lys Asp Arg Lys Leu Phe Ser Leu
            675             680                 685

gct aaa gac aaa aat gta act aca ttt tta aag gaa aat gca aaa aat        2112
Ala Lys Asp Lys Asn Val Thr Thr Phe Leu Lys Glu Asn Ala Lys Asn
            690             695                 700

tgt tct aat ata gat ttt aca aaa ata ttc gat cag ctt gac aaa ctc        2160
Cys Ser Asn Ile Asp Phe Thr Lys Ile Phe Asp Gln Leu Asp Lys Leu
705             710             715                 720

ttt aag gaa aga tgt tca tgt atg gat aca caa gtt tta gaa gta aaa        2208
Phe Lys Glu Arg Cys Ser Cys Met Asp Thr Gln Val Leu Glu Val Lys
                725             730                 735

aac aaa gaa atg tta tct ata gac tca aat agt gaa gat gcg aca gat        2256
Asn Lys Glu Met Leu Ser Ile Asp Ser Asn Ser Glu Asp Ala Thr Asp
                740             745                 750

ata agt gag aaa aat gga gag gaa gaa tta tat gta aat cac aat tct        2304
Ile Ser Glu Lys Asn Gly Glu Glu Glu Leu Tyr Val Asn His Asn Ser
            755             760                 765

gtg agt gtc gca agt ggt aat aaa gaa atc gaa aag agt aag gat gaa        2352
Val Ser Val Ala Ser Gly Asn Lys Glu Ile Glu Lys Ser Lys Asp Glu
            770             775                 780

aag caa cct gaa aaa gaa gca aaa caa act aat gga act tta acc gta        2400
Lys Gln Pro Glu Lys Glu Ala Lys Gln Thr Asn Gly Thr Leu Thr Val
785             790             795                 800

cga act gac aaa gat tca gat aga aac aaa gga aaa gat aca gct act        2448
Arg Thr Asp Lys Asp Ser Asp Arg Asn Lys Gly Lys Asp Thr Ala Thr
                805             810                 815

gat aca aaa aat tca cct gaa aat tta aaa gta cag gaa cat gga aca        2496
Asp Thr Lys Asn Ser Pro Glu Asn Leu Lys Val Gln Glu His Gly Thr
            820             825                 830

aat gga gaa aca ata aaa gaa gaa cca cca aaa tta cct gaa tca tct        2544
Asn Gly Glu Thr Ile Lys Glu Glu Pro Pro Lys Leu Pro Glu Ser Ser
            835             840                 845

gaa aca tta caa tca caa gaa caa tta gaa gca gaa gca caa aaa caa        2592
Glu Thr Leu Gln Ser Gln Glu Gln Leu Glu Ala Glu Ala Gln Lys Gln
            850             855                 860

aaa caa gaa gaa gaa cca aaa aaa aaa caa gaa gaa gaa cca aaa aaa        2640
Lys Gln Glu Glu Glu Pro Lys Lys Lys Gln Glu Glu Glu Pro Lys Lys
865             870             875                 880
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13

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aaa caa gaa gaa gaa caa aaa cga gaa caa gaa caa aaa caa gaa caa      2688
Lys Gln Glu Glu Glu Gln Lys Arg Glu Gln Glu Gln Lys Gln Glu Gln
                    885                 890                 895

gaa gaa gaa gaa caa aaa caa gaa gaa gaa caa caa ata caa gat caa      2736
Glu Glu Glu Glu Gln Lys Gln Glu Glu Glu Gln Gln Ile Gln Asp Gln
                900                 905                 910

tca caa agt gga tta gat caa tcc tca aaa gta gga gta gcg agt gaa      2784
Ser Gln Ser Gly Leu Asp Gln Ser Ser Lys Val Gly Val Ala Ser Glu
            915                 920                 925

caa aat gaa att tct tca gga caa gaa caa aac gta aaa agc tct tca      2832
Gln Asn Glu Ile Ser Ser Gly Gln Glu Gln Asn Val Lys Ser Ser Ser
        930                 935                 940

cct gaa gta gtt cca caa gaa aca act agt gaa aat ggg tca tca caa      2880
Pro Glu Val Val Pro Gln Glu Thr Thr Ser Glu Asn Gly Ser Ser Gln
945                 950                 955                 960

gac aca aaa ata tca agt act gaa cca aat gag aat tct gtt gta gat      2928
Asp Thr Lys Ile Ser Ser Thr Glu Pro Asn Glu Asn Ser Val Val Asp
                965                 970                 975

aga gca aca gat agt atg aat tta gat cct gaa aag gtt cat aat gaa      2976
Arg Ala Thr Asp Ser Met Asn Leu Asp Pro Glu Lys Val His Asn Glu
            980                 985                 990

aat atg agt gat cca aat aca aat  act gaa cca gat gca  tct tta aaa    3024
Asn Met Ser Asp Pro Asn Thr Asn  Thr Glu Pro Asp Ala  Ser Leu Lys
            995                 1000                 1005

gat gat  aag aag gaa gtt gat  gat gcc aaa aaa gaa  ctt caa tct       3069
Asp Asp  Lys Lys Glu Val Asp  Asp Ala Lys Lys Glu  Leu Gln Ser
    1010                 1015                 1020

act gta  tca aga att gaa tct  aat gaa cag gac gtt  caa agt aca       3114
Thr Val  Ser Arg Ile Glu Ser  Asn Glu Gln Asp Val  Gln Ser Thr
    1025                 1030                 1035

cca ccc  gaa gat act cct act  gtt gaa gga aaa gta  gga gat aaa       3159
Pro Pro  Glu Asp Thr Pro Thr  Val Glu Gly Lys Val  Gly Asp Lys
    1040                 1045                 1050

gca gaa  atg tta act tct ccg  cat gcg aca gat aat  tct gag tcg       3204
Ala Glu  Met Leu Thr Ser Pro  His Ala Thr Asp Asn  Ser Glu Ser
    1055                 1060                 1065

gaa tca  ggt tta aat cca act  gat gac att aaa aca  act gat ggt       3249
Glu Ser  Gly Leu Asn Pro Thr  Asp Asp Ile Lys Thr  Thr Asp Gly
    1070                 1075                 1080

gtt gtt  aaa gaa caa gaa ata  tta ggg gga ggt gaa  agt gca act       3294
Val Val  Lys Glu Gln Glu Ile  Leu Gly Gly Gly Glu  Ser Ala Thr
    1085                 1090                 1095
```

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gaa aca tca aaa agt aat tta  gaa aaa cct aag gat  gtt gaa cct        3339
Glu Thr Ser Lys Ser Asn Leu  Glu Lys Pro Lys Asp  Val Glu Pro
    1100             1105               1110

tct cat gaa ata tct gaa cct  gtt ctt tct ggt aca  act ggt aaa        3384
Ser His Glu Ile Ser Glu Pro  Val Leu Ser Gly Thr  Thr Gly Lys
    1115             1120               1125

gaa gaa tca gag tta tta aaa  agt aaa tcg ata gag  acg aag ggg        3429
Glu Glu Ser Glu Leu Leu Lys  Ser Lys Ser Ile Glu  Thr Lys Gly
    1130             1135               1140

gaa aca gat cct cga agt aat  gac caa gaa gat gct  act gac gat        3474
Glu Thr Asp Pro Arg Ser Asn  Asp Gln Glu Asp Ala  Thr Asp Asp
    1145             1150               1155

gtt gta gaa aat agt aga gat  gat aat aat agt ctc  tct aat agc        3519
Val Val Glu Asn Ser Arg Asp  Asp Asn Asn Ser Leu  Ser Asn Ser
    1160             1165               1170

gta gat aat caa agt aat gtt  tta aat aga gaa gat  cct att gct        3564
Val Asp Asn Gln Ser Asn Val  Leu Asn Arg Glu Asp  Pro Ile Ala
    1175             1180               1185

tct gaa act gaa gtt gta agt  gaa cct gag gat tca  agt agg ata        3609
Ser Glu Thr Glu Val Val Ser  Glu Pro Glu Asp Ser  Ser Arg Ile
    1190             1195               1200

atg act aca gaa gtt cca agt  act act gta aaa ccc  cct gat gaa        3654
Met Thr Thr Glu Val Pro Ser  Thr Thr Val Lys Pro  Pro Asp Glu
    1205             1210               1215

aaa cga tct gaa gaa gta gga  gaa aaa gaa gct aaa  gaa att aaa        3699
Lys Arg Ser Glu Glu Val Gly  Glu Lys Glu Ala Lys  Glu Ile Lys
    1220             1225               1230

gta gaa cct gtt gta cca aga  gcc att gga gaa cca  atg gaa aat        3744
Val Glu Pro Val Val Pro Arg  Ala Ile Gly Glu Pro  Met Glu Asn
    1235             1240               1245

tct gtg agc gta cag tcc cct  cct aat gta gaa gat  gtt gaa aaa        3789
Ser Val Ser Val Gln Ser Pro  Pro Asn Val Glu Asp  Val Glu Lys
    1250             1255               1260

gaa aca ttg ata tct gag aat  aat gga tta cat aat  gat aca cac        3834
Glu Thr Leu Ile Ser Glu Asn  Asn Gly Leu His Asn  Asp Thr His
    1265             1270               1275

aga gga aat atc agt gaa aag  gat tta atc gat att  cat ttg tta        3879
Arg Gly Asn Ile Ser Glu Lys  Asp Leu Ile Asp Ile  His Leu Leu
    1280             1285               1290

aga aat gaa gcg ggt agt aca  ata tta gat gat tct  aga aga aat        3924
Arg Asn Glu Ala Gly Ser Thr  Ile Leu Asp Asp Ser  Arg Arg Asn
    1295             1300               1305
```

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gga gaa atg aca gaa ggt agc  gaa agt gat gtt gga  gaa tta caa          3969
Gly Glu Met Thr Glu Gly Ser  Glu Ser Asp Val Gly  Glu Leu Gln
    1310                1315             1320


gaa cat aat ttt agc aca caa  caa aaa gat gaa aaa  gat ttt gac          4014
Glu His Asn Phe Ser Thr Gln  Gln Lys Asp Glu Lys  Asp Phe Asp
    1325                1330             1335


caa att gcg agc gat aga gaa  aaa gaa gaa att caa  aaa tta ctt          4059
Gln Ile Ala Ser Asp Arg Glu  Lys Glu Glu Ile Gln  Lys Leu Leu
    1340                1345             1350


aat ata gga cat gaa gag gat  gaa gat gta tta aaa  atg gat aga          4104
Asn Ile Gly His Glu Glu Asp  Glu Asp Val Leu Lys  Met Asp Arg
    1355                1360             1365


aca gag gat agt atg agt gat  gga gtt aat agt cat  ttg tat tat          4149
Thr Glu Asp Ser Met Ser Asp  Gly Val Asn Ser His  Leu Tyr Tyr
    1370                1375             1380


aat aat cta tca agt gaa gaa  aaa atg gaa caa tat  aat aat aga          4194
Asn Asn Leu Ser Ser Glu Glu  Lys Met Glu Gln Tyr  Asn Asn Arg
    1385                1390             1395


gat gct tct aaa gat aga gaa  gaa ata ttg aat agg  tca aac aca          4239
Asp Ala Ser Lys Asp Arg Glu  Glu Ile Leu Asn Arg  Ser Asn Thr
    1400                1405             1410


aat aca tgt tct aat gaa cat  tca tta aaa tat tgt  caa tat atg          4284
Asn Thr Cys Ser Asn Glu His  Ser Leu Lys Tyr Cys  Gln Tyr Met
    1415                1420             1425


gaa aga aat aag gat tta tta  gaa aca tgt tct gaa  gac aaa agg          4329
Glu Arg Asn Lys Asp Leu Leu  Glu Thr Cys Ser Glu  Asp Lys Arg
    1430                1435             1440


tta cat tta tgt tgt gaa ata  tca gat tat tgt tta  aaa ttt ttc          4374
Leu His Leu Cys Cys Glu Ile  Ser Asp Tyr Cys Leu  Lys Phe Phe
    1445                1450             1455


aat cct aaa tcg ata gaa tac  ttt gat tgt aca caa  aaa gaa ttt          4419
Asn Pro Lys Ser Ile Glu Tyr  Phe Asp Cys Thr Gln  Lys Glu Phe
    1460                1465             1470


gat gac cct aca tat aat tgt  ttt aga aaa caa aga  ttt aca agt          4464
Asp Asp Pro Thr Tyr Asn Cys  Phe Arg Lys Gln Arg  Phe Thr Ser
    1475                1480             1485


atgtcatgtt ataaaattaa aaacaatata cattaatatg ttaataaaaa aaataatata     4524


ttttttctc tttttctttt tttttaatag gt atg cat  tat att gcc ggg ggt       4577
                                   Met His  Tyr Ile Ala Gly Gly
                                       1490                 1495


ggt ata ata gcc ctt  tta ttg ttt att tta  ggt tca gcc agc tat         4622
Gly Ile Ile Ala Leu  Leu Leu Phe Ile Leu  Gly Ser Ala Ser Tyr
            1500                1505             1510
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16

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agg aag aat ttg taagaaaaaa aggatgaaga aatataaaca aaaatataaa              4674
Arg Lys Asn Leu


tatatgcata tatatttaag tattataaga acatatatat aaataaatat gtatattttt        4734

attttattat tatagg gat  gat gaa aaa gga ttc  tac gat tct aat tta         4783
               Asp  Asp Glu Lys Gly Phe  Tyr Asp Ser Asn Leu
               1515                1520                1525

aat gat tct gct ttt  gaa tat aat aat aat  aaa tat aat aaa tta           4828
Asn Asp Ser Ala Phe  Glu Tyr Asn Asn Asn  Lys Tyr Asn Lys Leu
            1530                1535                1540

cct tat atg tgtaaggaaa aaactaaaaa acaaaaaaaa aaaaaaatat                  4877
Pro Tyr Met


atatatatat atatatattt acggatgcat ttccacattc ctattatttc ttattcttat        4937

aatttttatt atttatttat ttattttttt ttttc gta gtt  gat caa caa ata         4990
                                        Val Val  Asp Gln Gln Ile
                                             1545

aat  gta gta aat tct gat  tta tat tcg gag ggt  att tat gat gac          5035
Asn  Val Val Asn Ser Asp  Leu Tyr Ser Glu Gly  Ile Tyr Asp Asp
1550                1555                1560

aca  acg aca ttt taa                                                     5050
Thr  Thr Thr Phe
1565


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<213>  Plasmodium falciparum

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Met Lys Gly Lys Met Asn Met Cys Leu Phe Phe Phe Tyr Ser Ile Leu
1               5               10                  15


Tyr Val Val Leu Cys Thr Tyr Val Leu Gly Ile Ser Glu Glu Tyr Leu
            20                  25                  30


Lys Glu Arg Pro Gln Gly Leu Asn Val Glu Thr Asn Asn Asn Asn Asn
        35                  40                  45


Asn Asn Asn Asn Asn Asn Ser Asn Ser Asn Asp Ala Met Ser Phe Val
    50                  55                  60


Asn Glu Val Ile Arg Phe Ile Glu Asn Glu Lys Asp Asp Lys Glu Asp
65                  70                  75                  80
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Lys Lys Val Lys Ile Ile Ser Arg Pro Val Glu Asn Thr Leu His Arg
              85                  90                  95

Tyr Pro Val Ser Ser Phe Leu Asn Ile Lys Lys Tyr Gly Arg Lys Gly
            100                 105                 110

Glu Tyr Leu Asn Arg Asn Ser Phe Val Gln Arg Ser Tyr Ile Arg Gly
            115                 120                 125

Cys Lys Gly Lys Arg Ser Thr His Thr Trp Ile Cys Glu Asn Lys Gly
    130                 135                 140

Asn Asn Asn Ile Cys Ile Pro Asp Arg Arg Val Gln Leu Cys Ile Thr
145                 150                 155                 160

Ala Leu Gln Asp Leu Lys Asn Ser Gly Ser Glu Thr Thr Asp Arg Lys
                165                 170                 175

Leu Leu Arg Asp Lys Val Phe Asp Ser Ala Met Tyr Glu Thr Asp Leu
            180                 185                 190

Leu Trp Asn Lys Tyr Gly Phe Arg Gly Phe Asp Asp Phe Cys Asp Asp
            195                 200                 205

Val Lys Asn Ser Tyr Leu Asp Tyr Lys Asp Val Ile Phe Gly Thr Asp
    210                 215                 220

Leu Asp Lys Asn Asn Ile Ser Lys Leu Val Glu Glu Ser Leu Lys Arg
225                 230                 235                 240

Phe Phe Lys Lys Asp Ser Ser Val Leu Asn Pro Thr Ala Trp Trp Arg
                245                 250                 255

Arg Tyr Gly Thr Arg Leu Trp Lys Thr Met Ile Gln Pro Tyr Ala His
            260                 265                 270

Leu Gly Cys Arg Lys Pro Asp Glu Asn Glu Pro Gln Ile Asn Arg Trp
            275                 280                 285

Ile Leu Glu Trp Gly Lys Tyr Asn Cys Arg Leu Met Lys Glu Lys Glu
    290                 295                 300

Lys Leu Leu Thr Gly Glu Cys Ser Val Asn Arg Lys Lys Ser Asp Cys
305                 310                 315                 320
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Ser Thr Gly Cys Asn Asn Glu Cys Tyr Thr Tyr Arg Ser Leu Ile Asn
            325                 330                 335


Arg Gln Arg Tyr Glu Val Ser Ile Leu Gly Lys Lys Tyr Ile Lys Val
            340                 345                 350


Val Arg Tyr Thr Ile Phe Arg Arg Lys Ile Val Gln Pro Asp Asn Ala
            355                 360                 365


Leu Asp Phe Leu Lys Leu Asn Cys Ser Glu Cys Lys Asp Ile Asp Phe
    370                 375                 380


Lys Pro Phe Phe Glu Phe Glu Tyr Gly Lys Tyr Glu Glu Lys Cys Met
385                 390                 395                 400


Cys Gln Ser Tyr Ile Asp Leu Lys Ile Gln Phe Lys Asn Asn Asp Ile
            405                 410                 415


Cys Ser Phe Asn Ala Gln Thr Asp Thr Val Ser Ser Asp Lys Arg Phe
            420                 425                 430


Cys Leu Glu Lys Lys Glu Phe Lys Pro Trp Lys Cys Asp Lys Asn Ser
    435                 440                 445


Phe Glu Thr Val His His Lys Gly Val Cys Val Ser Pro Arg Arg Gln
    450                 455                 460


Gly Phe Cys Leu Gly Asn Leu Asn Tyr Leu Leu Asn Asp Asp Ile Tyr
465                 470                 475                 480


Asn Val His Asn Ser Gln Leu Leu Ile Glu Ile Ile Met Ala Ser Lys
            485                 490                 495


Gln Glu Gly Lys Leu Leu Trp Lys Lys His Gly Thr Ile Leu Asp Asn
            500                 505                 510


Gln Asn Ala Cys Lys Tyr Ile Asn Asp Ser Tyr Val Asp Tyr Lys Asp
            515                 520                 525


Ile Val Ile Gly Asn Asp Leu Trp Asn Asp Asn Asn Ser Ile Lys Val
    530                 535                 540
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Gln Asn Asn Leu Asn Leu Ile Phe Glu Arg Asn Phe Gly Tyr Lys Val
545   550   555   560

Gly Arg Asn Lys Leu Phe Lys Thr Ile Lys Glu Leu Lys Asn Val Trp
                565   570   575

Trp Ile Leu Asn Arg Asn Lys Val Trp Glu Ser Met Arg Cys Gly Ile
            580   585   590

Asp Glu Val Asp Gln Arg Arg Lys Thr Cys Glu Arg Ile Asp Glu Leu
            595   600   605

Glu Asn Met Pro Gln Phe Phe Arg Trp Phe Ser Gln Trp Ala His Phe
    610   615   620

Phe Cys Lys Glu Lys Glu Tyr Trp Glu Leu Lys Leu Asn Asp Lys Cys
625   630   635   640

Thr Gly Asn Asn Gly Lys Ser Leu Cys Gln Asp Lys Thr Cys Gln Asn
            645   650   655

Val Cys Thr Asn Met Asn Tyr Trp Thr Tyr Thr Arg Lys Leu Ala Tyr
            660   665   670

Glu Ile Gln Ser Val Lys Tyr Asp Lys Asp Arg Lys Leu Phe Ser Leu
    675   680   685

Ala Lys Asp Lys Asn Val Thr Thr Phe Leu Lys Glu Asn Ala Lys Asn
    690   695   700

Cys Ser Asn Ile Asp Phe Thr Lys Ile Phe Asp Gln Leu Asp Lys Leu
705   710   715   720

Phe Lys Glu Arg Cys Ser Cys Met Asp Thr Gln Val Leu Glu Val Lys
            725   730   735

Asn Lys Glu Met Leu Ser Ile Asp Ser Asn Ser Glu Asp Ala Thr Asp
            740   745   750

Ile Ser Glu Lys Asn Gly Glu Glu Glu Leu Tyr Val Asn His Asn Ser
            755   760   765

Val Ser Val Ala Ser Gly Asn Lys Glu Ile Glu Lys Ser Lys Asp Glu
    770   775   780

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Lys Gln Pro Glu Lys Glu Ala Lys Gln Thr Asn Gly Thr Leu Thr Val
785             790             795                 800

Arg Thr Asp Lys Asp Ser Asp Arg Asn Lys Gly Lys Asp Thr Ala Thr
                805             810                 815

Asp Thr Lys Asn Ser Pro Glu Asn Leu Lys Val Gln Glu His Gly Thr
                820             825                 830

Asn Gly Glu Thr Ile Lys Glu Glu Pro Pro Lys Leu Pro Glu Ser Ser
            835             840             845

Glu Thr Leu Gln Ser Gln Glu Gln Leu Glu Ala Glu Ala Gln Lys Gln
    850             855             860

Lys Gln Glu Glu Glu Pro Lys Lys Lys Gln Glu Glu Glu Pro Lys Lys
865             870             875                 880

Lys Gln Glu Glu Glu Gln Lys Arg Glu Gln Glu Gln Lys Gln Glu Gln
            885             890             895

Glu Glu Glu Glu Gln Lys Gln Glu Glu Glu Gln Gln Ile Gln Asp Gln
            900             905             910

Ser Gln Ser Gly Leu Asp Gln Ser Ser Lys Val Gly Val Ala Ser Glu
    915             920             925

Gln Asn Glu Ile Ser Ser Gly Gln Glu Gln Asn Val Lys Ser Ser Ser
    930             935             940

Pro Glu Val Val Pro Gln Glu Thr Thr Ser Glu Asn Gly Ser Ser Gln
945             950             955                 960

Asp Thr Lys Ile Ser Ser Thr Glu Pro Asn Glu Asn Ser Val Val Asp
                965             970             975

Arg Ala Thr Asp Ser Met Asn Leu Asp Pro Glu Lys Val His Asn Glu
            980             985             990

Asn Met Ser Asp Pro Asn Thr Asn  Thr Glu Pro Asp Ala  Ser Leu Lys
    995             1000            1005
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Asp Asp  Lys Lys Glu Val Asp  Asp Ala Lys Lys Glu  Leu Gln Ser
    1010             1015              1020

Thr Val  Ser Arg Ile Glu Ser  Asn Glu Gln Asp Val  Gln Ser Thr
    1025             1030              1035

Pro Pro  Glu Asp Thr Pro Thr  Val Glu Gly Lys Val  Gly Asp Lys
    1040             1045              1050

Ala Glu  Met Leu Thr Ser Pro  His Ala Thr Asp Asn  Ser Glu Ser
    1055             1060              1065

Glu Ser  Gly Leu Asn Pro Thr  Asp Asp Ile Lys Thr  Thr Asp Gly
    1070             1075              1080

Val Val  Lys Glu Gln Glu Ile  Leu Gly Gly Gly Glu  Ser Ala Thr
    1085             1090              1095

Glu Thr  Ser Lys Ser Asn Leu  Glu Lys Pro Lys Asp  Val Glu Pro
    1100             1105              1110

Ser His  Glu Ile Ser Glu Pro  Val Leu Ser Gly Thr  Thr Gly Lys
    1115             1120              1125

Glu Glu  Ser Glu Leu Leu Lys  Ser Lys Ser Ile Glu  Thr Lys Gly
    1130             1135              1140

Glu Thr  Asp Pro Arg Ser Asn  Asp Gln Glu Asp Ala  Thr Asp Asp
    1145             1150              1155

Val Val  Glu Asn Ser Arg Asp  Asp Asn Asn Ser Leu  Ser Asn Ser
    1160             1165              1170

Val Asp  Asn Gln Ser Asn Val  Leu Asn Arg Glu Asp  Pro Ile Ala
    1175             1180              1185

Ser Glu  Thr Glu Val Val Ser  Glu Pro Glu Asp Ser  Ser Arg Ile
    1190             1195              1200

Met Thr  Thr Glu Val Pro Ser  Thr Thr Val Lys Pro  Pro Asp Glu
    1205             1210              1215

Lys Arg  Ser Glu Glu Val Gly  Glu Lys Glu Ala Lys  Glu Ile Lys
    1220             1225              1230
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22

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Val Glu  Pro Val Val Pro Arg  Ala Ile Gly Glu Pro  Met Glu Asn
    1235             1240                 1245


Ser Val  Ser Val Gln Ser Pro  Pro Asn Val Glu Asp  Val Glu Lys
    1250             1255                 1260


Glu Thr  Leu Ile Ser Glu Asn  Asn Gly Leu His Asn  Asp Thr His
    1265             1270                 1275


Arg Gly  Asn Ile Ser Glu Lys  Asp Leu Ile Asp Ile  His Leu Leu
    1280             1285                 1290


Arg Asn  Glu Ala Gly Ser Thr  Ile Leu Asp Asp Ser  Arg Arg Asn
    1295             1300                 1305


Gly Glu  Met Thr Glu Gly Ser  Glu Ser Asp Val Gly  Glu Leu Gln
    1310             1315                 1320


Glu His  Asn Phe Ser Thr Gln  Gln Lys Asp Glu Lys  Asp Phe Asp
    1325             1330                 1335


Gln Ile  Ala Ser Asp Arg Glu  Lys Glu Glu Ile Gln  Lys Leu Leu
    1340             1345                 1350


Asn Ile  Gly His Glu Glu Asp  Glu Asp Val Leu Lys  Met Asp Arg
    1355             1360                 1365


Thr Glu  Asp Ser Met Ser Asp  Gly Val Asn Ser His  Leu Tyr Tyr
    1370             1375                 1380


Asn Asn  Leu Ser Ser Glu Glu  Lys Met Glu Gln Tyr  Asn Asn Arg
    1385             1390                 1395


Asp Ala  Ser Lys Asp Arg Glu  Glu Ile Leu Asn Arg  Ser Asn Thr
    1400             1405                 1410


Asn Thr  Cys Ser Asn Glu His  Ser Leu Lys Tyr Cys  Gln Tyr Met
    1415             1420                 1425


Glu Arg  Asn Lys Asp Leu Leu  Glu Thr Cys Ser Glu  Asp Lys Arg
    1430             1435                 1440
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    Leu His  Leu Cys Cys Glu Ile  Ser Asp Tyr Cys Leu  Lys Phe Phe
        1445                 1450                 1455


    Asn Pro  Lys Ser Ile Glu Tyr  Phe Asp Cys Thr Gln  Lys Glu Phe
        1460                 1465                 1470


    Asp Asp  Pro Thr Tyr Asn Cys  Phe Arg Lys Gln Arg  Phe Thr Ser
        1475                 1480                 1485


    Met His  Tyr Ile Ala Gly Gly  Gly Ile Ile Ala Leu  Leu Leu Phe
        1490                 1495                 1500


    Ile Leu  Gly Ser Ala Ser Tyr  Arg Lys Asn Leu Asp  Asp Glu Lys
        1505                 1510                 1515


    Gly Phe  Tyr Asp Ser Asn Leu  Asn Asp Ser Ala Phe  Glu Tyr Asn
        1520                 1525                 1530


    Asn Asn  Lys Tyr Asn Lys Leu  Pro Tyr Met Val Val  Asp Gln Gln
        1535                 1540                 1545


    Ile Asn  Val Val Asn Ser Asp  Leu Tyr Ser Glu Gly  Ile Tyr Asp
        1550                 1555                 1560


    Asp Thr  Thr Thr Phe
        1565
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cctggagccc gtcagtatcg gcgg
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24

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cggaatcagg tttaaatcca ac                                       22


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